Space Weather Forecast

Issued on Saturday, 30 December 2023 at 12:41 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares. Slight chance G1-Minor storms from the fast wind from a coronal hole day 3 (01 Jan).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with occasional common class flares, the largest from a sunspot region that is now close to the western solar horizon, so difficult to assess. There are a total of five sunspot regions on the disc, with the main development and growth occurring with the region in the southeast. This was the source of some small common-class flaring. The other regions on the disc remained small and stable, with the other larger region in the northwest showing sign of decay. There were no Earth-directed coronal mass ejections (CMEs), however a large eruption occurred off the southeast disc, with imagery for analysis currently not available. This was due to a 'filament' eruption, which is a line of plasma held by the Suns magnetic field, and are often the source of observed CMEs. Given the location of the eruption however, an Earth-directed component is not expected. There are further notable filaments on the Earth-side of the Sun, including a large mobile filament in the northwest, however these are mainly rotating towards the western horizon with a lowering chance of any Earth-directed eruption.

Solar Wind / Geomagnetic Activity: Weak CME affects gave way to more typical slow wind conditions through the period. Mainly background speeds were observed, generally between 350-400 km/s but with a brief spike at 29/2146 UTC to slightly elevated levels near 450kms before quickly easing back to background. Interplanetary Magnetic Field (IMF) was weak to moderate, with a couple of small enhancements, both at first and again at 29/2230 UTC, before again easing to be mainly weak from 29/0600 UTC. The north-south component was mainly weak but briefly moderately positive (northward), but with further brief rotations to weak negative (southward) values. Phi angle was mainly negative (towards the Sun), with brief period of positive (away from the Sun). Geomagnetic activity remained Quiet (Kp1-2).

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) persisted at background, with no Solar Radiation Storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Low activity is expected, but with an increasing chance of rising to Moderate with isolated M-flares possible, given any further development of the regions on the Earth-facing disc, or from the expected return of ex-AR3514 later in the period.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Slow wind conditions are expected until the arrival of the fast wind of CH86 on day 3 (01 Jan). Elevated winds are forecast, around 500-600km/s, and likely persisting day 4 (02 Jan). Mainly Quiet geomagnetic activity at first, becoming Unsettled day 3 with a chance of Active intervals and a slight chance of an isolated G1 Minor Storm interval from the fast wind onset. Activity easing to Quiet with a chance of Unsettled intervals day 4.

Energetic Particles / Solar Radiation: Count rate of energetic particles (high energy protons) is expected to persist at background, with no Solar Radiation Storms occurring.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	20	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	30	40	40
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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